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Office title: Wool bags made from a mesh or fabric layer between polymer layers

(54) Applicant title: Improvements in packaging, particularly wool bags

(57) Abstract:

Patent 503156

A material for forming a wool bag includes a first film of multilayer material 20 which comprises a first layer 22 of a polymer having a relatively high melting point above 180 °C and a second layer 26 of a polymer having a low temperature melting point below 180 °C. A linking means 24 links the first and second layers 22 & 26 together. A second film of multilayer material 30 includes a third layer 32 of a polymer having a low temperature melting point below 180 °C and a carrier layer 34. A mesh or fabric layer 12 is disposed between first film 20 and second film 30. First and second layers are either both bonded to fabric layer or bonded to each other through the mesh or through fabric layer. A number of holes are provided extending through the material. The arrangement is such that channels 36 in the fabric layer or channels which are adjacent members forming the mesh, allow the passage of air between the first and second films in the plane of the material.

Drawing:

FIG 1

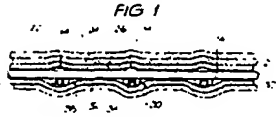

FIG 2

** End of report **

Patents Form No. 5

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Patents Act 1953

DUROMER PRODUCTS PTY LTS

COMPLETE SPECIFICATION

Invention Title:

Improvements in packaging, particularly wool bags

[I/We] [*State (in full) name, address, and nationality of applicant or applicants as in application form*], hereby declare the invention, for which [I/we] pray that a patent may be granted to [me/us], and the method by which it is performed, to be particularly described in and by the following statement:-

Field of the Invention

The present invention relates to improvements in packaging materials, particularly for wool bags.

Background of the Invention

Wool bags are containers which are used to carry wool, the filled bags being referred to as wool bales. It is an important requirement for wool bales that they contain wool in a tightly packed form whilst retaining a substantially regular shape which allows the bales to be stacked in accordance with industry requirements. Wool bags are currently made from either woven high density polyethylene or woven nylon.

However, woven wool bags have some substantial disadvantages. Wool is sampled by a process known as core sampling, in which process a hole or holes is/are cut through the wool bag and a sample of wool removed. In this process the high density polyethylene tends to defibrillate and small bits of fibre contaminate the wool. Any fibrous polyethylene or nylon that contaminates the wool within the bale is difficult to remove during the subsequent processing of the wool and can lead to contamination of the final fabric produced from the wool. Polyethylene is a "non-substantive" fibre which means that it takes dye at a different rate from wool fibre. Any contamination of wool with polyethylene can spoil fabric made from the contaminated wool. Nylon is "substantive" which means it takes dye at substantially the same rate as the wool so the effect of contamination of the wool with nylon is much less damaging than contamination with polyethylene. However, a woven nylon sack is approximately four times the cost of a woven high density polyethylene bag and consequently results in added expense as compared with using a polyethylene bag.

Wool bales must also be able to withstand the forces and temperatures involved in the formation of "dumped" or compressed wool bales. Wool bales are compressed in order to reduce their volume so that they take up less space when being transported, or stored. During the dumping process, bales of wool are generally compressed 3::1 by volume, usually three bales being compressed into the volume occupied by one bale. In the dumping process, three bales are placed end to end between two large metal plates and the bales are compressed. The compression of the bales creates a considerable amount of friction and heat, typically resulting in temperatures of 150°C to

180°C. The wool bag material has to be able to withstand those temperatures and also has allow the egress of air from the bales, i.e. the bag has to be able to breath during the dumping process.

Attempts have been made to make wool bags from plastic films. These attempts have failed for a number of reasons. The polymers used to form the plastic films either have too low a melting point so they cannot withstand the heat generated in the dumping process, and/or the films do not breath and consequently prevent air from leaving the wool bale. This can lead to the explosion of the wool bag.

The present invention seeks to provide a wool bag which is cheaper to make than a woven nylon bag but yet is compressible during the dumping process. which is also to withstand the heat generated during the dumping process and which is preferably recyclable.

Summary of the Invention

In a first broad aspect. the present invention provides a material for forming a wool bag including:-

(a) a first film of multi layer material, said first film comprising:

a first layer comprised of a polymer having a relatively high melting point above about 180°C;

a second layer of a polymer having a low temperature melting point; and

means for linking the first and second layers together such as a tie layer or the like sandwiched between the first layer and the second layer of film:

(b) a second film of multi-layer material including a third layer of a polymer having a low temperature melting point, preferably the same polymer as the second, and a fourth or carrier layer; and

a mesh or textile disposed between the first film and the second film. the first and second layers being either both bonded to the fabric or bonded to each other through the mesh or through the fabric, a number of holes extending through the material, the arrangement being such that channels in the fabric or adjacent members forming the mesh, allow the passage of air between the first and second sheets in the plane of the material.

The present invention also provides a wool bag constructed from the material of the present invention with the relatively high melting point layer disposed on the exterior of the bag.

The polymer having a melting point above the dumping temperature (about 180°C) is most preferably nylon, and may be either nylon 6 or nylon 66 or nylon 666 or blends of these.

If nylon is used, the outer layer may be as little as 10 to 20 microns thick which is a tiny fraction of the nylon required for woven nylon mesh bags. As nylon is an expensive polymer this results in substantial cost savings.

The layers of polymer having a low melting point may be Surlyn™ or single site metalocene polymers.

The middle layer may be a mesh of the type which is typically used for making net bags for fruit such as oranges or the like such as Netlon™. Such meshes are typically formed by forming a grid of members comprising strands of the polymers and then welding them together with the application of heat which results in the formation of enlarged nodules where the members of the grid intersect. Such a grid has a substantially advantage when used in the material of the present invention in that the modules prevent the outer and inner layers from laminating together at or near the nodule and assist in the passage of air in the plane of the sheet material. However, the mesh could be formed from other materials such as polypropylene, polyethylene or nylon.

The use of netting has other advantages in that handling technology for wool bales is unsophisticated, typically grab hooks are used to pick up and hoist the bales, and the provision of the use of a mesh helps prevent the material from tearing. However, a woven fabric could also be used in place of a mesh.

An additional advantage of the present invention is that the material provides contact clarity. In other words, it is possible to look through a wool bag and see any wool in contact or close to the material so that buyers of wool bales get a better chance to see the product which they may wish to purchase.

The use of two layers and the inner mesh bonded together, provides a material which is surprisingly strong, is resistant to tear propagation. Although the material is particularly useful for forming wool bags, it may have other uses where similar properties are required.

Brief Description of the Drawings

The invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a schematic plan view of a sheet of material for forming a wool bag embodying the present invention:

Figure 2 is a schematic view along lines II-II shown in Figure 1; and

Figure 3 is a schematic view along lines III-III shown in Figure 1.

Detailed Description of a Preferred Embodiment

Referring to the drawings, the Figures show a sheet of material 10 for forming a wool bag comprising a mesh 12 sandwiched between two multi-layer films. The mesh is formed from Netlon™ which comprises a grid of parallel members 12a, 12b intersecting at right angles with enlarged nodules 14 formed where the members intersect and are welded together.

With reference to Figures 2 and 3, the first multi-layer, generally indicated at 20 comprises an outer layer of nylon 22, an outer layer of Surlyn™ 26 and an inner tie layer 24 formed from a material which can be bonded to both the nylon 22 and to the layer of Surlyn™. The second multi-layer 30 film comprises a polymer layer 32 also made from Surlyn™ bonded to a carrier layer 34.

The layers 26 and 32 of Surlyn™ can be heat activated to seal together at 85°C and they bond together in the square spaces between the squares of the grid 12. However, because of the presence of the grid 12, channels 36 are formed where there is a gap between the layers and this allows air to travel in the plane of the material along those channels. The material 10 also has a number of holes, not shown, pierced through, including some holes which pass into the channels 36. The material is made up into a bag with the nylon film 22 on the outside to form a wool bale. During the compression process when three such bags are typically compressed into one, the outer surfaces of the wool bags are pressed flush between two steel plates which are closed together to compress the wool bales. Using the material of wool bag of the

present invention, excess air can escape in the plane of the material parallel to the plane of the compression plates by travelling along the channels 36. This is particularly advantageous since air trying to travel at right angles through the material would be trapped by the steel plates and would not be able to escape. and the bag could explode.

Although the present invention describes a wool bag formed from material comprising a three layer multi-layer film and a two layer multi-layer film. variations in the number of layers of the multi-layer films would be possible depending on the desired properties of the bag.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

What [I/we] claim is:

1. A material for forming a wool bag including:-

(a) a first film of multi layer material, said first film comprising:

a first layer comprised of a polymer having a relatively high melting point above about 180°C:

a second layer of a polymer having a low temperature melting point below about 180°C: and

linking means. linking the first and second layers together:

(b) a second film of multi-layer material including a third layer of a polymer having a low temperature melting point below about 180°C, and a carrier layer: and

a mesh or fabric layer disposed between the first film and the second film. the first and second layers being either both bonded to the fabric layer or bonded to each other through the mesh or through the fabric layer.

wherein a number of holes are provided extending through the material. the arrangement being such that channels in the fabric layer, or channels which are adjacent members forming the mesh, allow the passage of air between the first and second films in the plane of the material.

2. A material as claimed in claim 1. wherein the polymer having a melting point above 180°C is nylon.

3. The material of claim 2 wherein the nylon is selected from the group consisting of a nylon and blends of nylons.

4. A material as claimed in claim 2 or claim 3 the thickness of the first layer is 10 to 20 microns.

5. A material as claimed in any preceding claim wherein the first and third layers of polymer having a low melting point are single site metalocene polymers.

6. A material as claimed in any preceding claim wherein the mesh or textile layer is a mesh of the type made by forming a grid of members comprising strands of the polymers and then welding them together with the application of heat and includes enlarged nodules where the members of the grid intersect.

7. A material as claimed in claim 6 wherein the mesh is formed from materials selected from the group consisting of polypropylene. polyethylene and nylon.

8. A material as claimed in any one of claims 2 to 5 wherein the mesh or textile layer is a woven fabric.

9. A wool bag constructed from the material of claims 1 to 8 wherein the high melting point layer is disposed on the exterior of the bag.

10. A material substantially as hereinbefore described with reference to the accompanying drawings.

11. A wool bag substantially as hereinbefore described with reference to the accompanying drawings.

Dated this eighteenth day of April 2000

Duromer Products Pty Ltd
Patent Attorneys for the Applicant:

F B RICE & CO

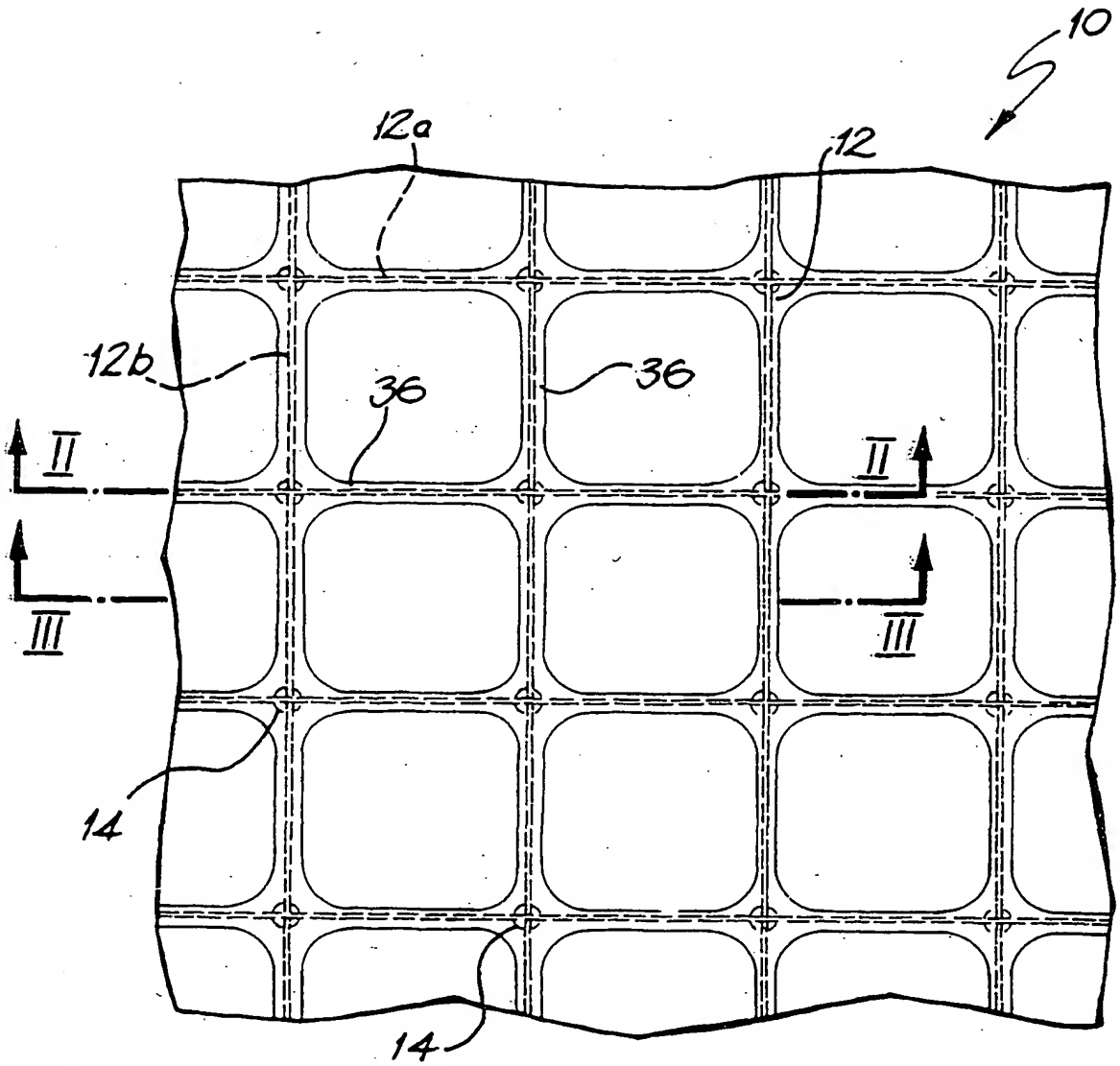

FIG. 1

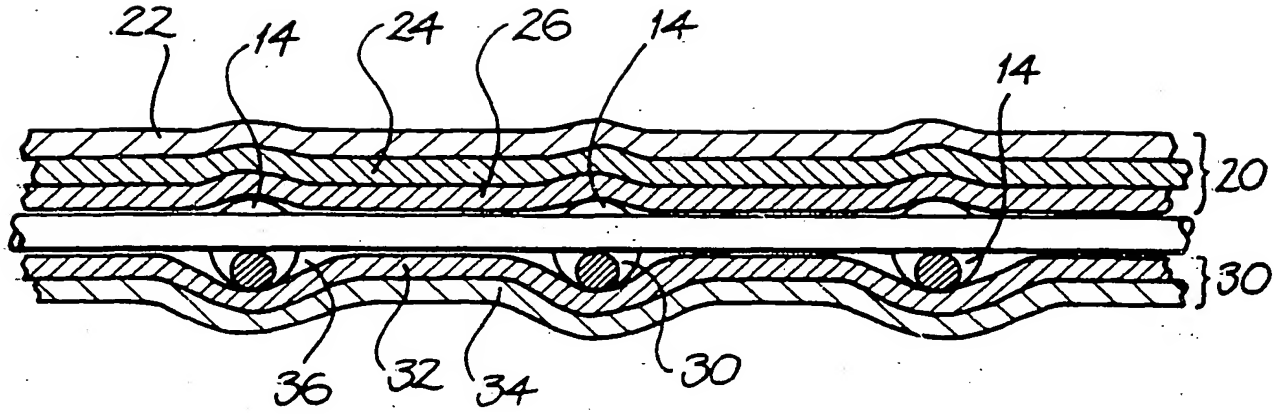

FIG. 2

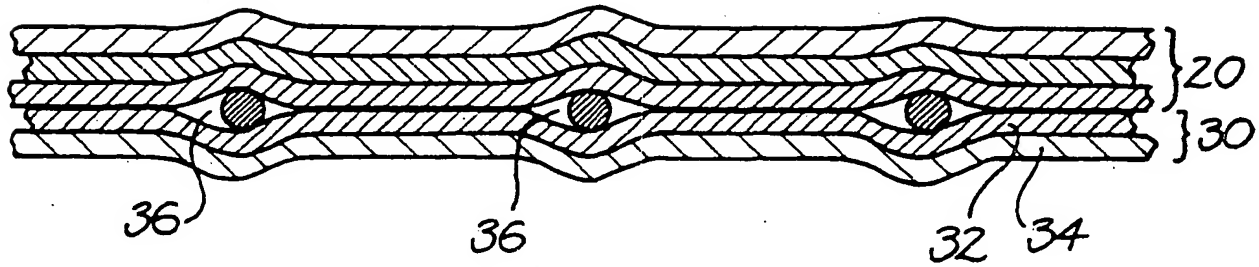

FIG. 3